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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/741,535	12/19/2000	Takashi Kumamoto	042390.P9482	6360

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EXAMINER

THAI, LUAN C

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 07/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/741,535

Applicant(s)

KUMAMOTO ET AL.

Examiner

Luan Thai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26,31 and 32 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26,31 and 32 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This Office action is responsive to the amendment filed May 10, 2002.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1-2, 4-8, 10, 14-15, and 19, are rejected under 35 U.S.C. 102(e) as being anticipated by Carney et al. (5,895,229).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 1-2, 4-8, 10, 14-15, and 19, Carney et al. teach a method comprising: placing an incomplete flip chip package into a bottom inner cavity 62 of a bottom mold portion 31, the incomplete chip package comprising a chip 12 and a substrate 14 electrically coupled using a flip chip process (re-flowed solder bumps 16), the chip having a top surface facing the substrate, a bottom surface opposite the top surface, and one or more side surfaces between the top and bottom surfaces; mating an upper mold portion 29 with the lower mold portion, the upper mold portion having an upper inner cavity forming a mold

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inner cavity enclosing the incomplete flip chip package, and forming a runner 60 between the upper and lower mold portions; injecting a predetermined amount of a liquid resin comprised silica spheres into the mold inner cavity through the runner 60, the resin encapsulating all the side surfaces, and filling a gap between the top surface of the chip and the adjacent portion of the upper surface, encapsulating the re-flowed solder bumps; and curing the resin.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carney et al. (5,895,229) in combination with Baba et al. (6,071,755 of record).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 3 and 17-18, the method of Carney et al. teaches all the steps the claimed invention as detailed above except for the chip package comprising a passive component.

A semiconductor package comprising chip components and a passive component, however, is conventional in semiconductor package art as taught by

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Baba et al. In fact, Baba et al disclose a semiconductor package comprising chip components 31 including a passive component 53 (see figures 20-10-17, Col. 12, lines 35+) for the purpose of having a higher mounting density, obtaining a higher performance and function to allow a smaller electronic device to be realized (Col. 12, lines 41+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a semiconductor package by the process as taught by Carney et al. including a passive component mounted on and electrically connected to the substrate, as taught by Baba et al., in order to have a higher mounting density and obtaining a higher performance and function.

5. Claim 12-13, 20-21 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carney et al. (5,895,229) in view of Chia et al. (6,081,997 of record)

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 12-13, 20 and 23-25, the method of Carney et al. teaches all the steps the claimed invention as detailed above except for the step of curing the liquid resin by maintaining the mold at an elevated temperature for a predetermined period of time, wherein the elevated temperature being equal to or greater than the cure temperature of the filled liquid resin for the predetermined period of time.

The step of curing the liquid resin by maintaining the mold at an elevated temperature, however, is conventional in the art, as disclosed by Chia et al (Col.

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6, lines 40+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to cure the liquid resin by maintaining the mold at an elevated temperature as claimed since such resin cured method is conventional in the art as taught by Chia et al.

Regarding claim 21, Carney et al. further disclose the liquid resin comprising epoxy and silica filler.

6. Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carney et al. (5,895,229) in view of Chia et al. (6,081,997 of record) and further in view of Weber (6,038,136).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 31-32, the proposed method of Carney et al. and Chia et al. teaches all the steps the claimed invention as detailed above except for the mold comprising air vents located opposite the runner.

Weber while related to a similar process design teaches the mold 30 having air vents 46 located opposite the runner 44 for controlling the mold cavity pressure. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the mold of the proposed method of Carney et al. and Chia et al. by forming air vents located opposite the runner in order to control the mold cavity pressure.

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7. Claims 9, 11 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carney et al. (5,895,229) in view of Lin et al. (5,450,283 of record).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 9, 11 and 26, the proposed device of Carney et al. teaches all the limitations of the claimed invention as detailed above except for a release film intervened between the bottom surface of the chip and the upper mold cavity surface.

Lin et al. while related to a similar package design teach (see specifically figures 3-4-5) a release film 38 intervened between the bottom surface 22 of the chip 18 and the upper mold cavity surface for the purpose of preventing flashing of the molding compound outside of the cavity 30 (Col. 4, lines 23+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Lin et al. teachings of the release film to the proposed device of Carney et al. in order to prevent flashing of the molding compound outside of the cavity.

8. Claims 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carney et al. (5,895,229) in view of Chia et al. (6,081,997 of record) and further in view of Glenn et al. (5,981,314 of record).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

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Regarding claims 16 and 22, the proposed device of Carney et al. and Chia et al. teaches all the limitations of the claimed invention as detailed above except for the thickness the substrate (e.g., being an approximate of 0.05 mm to 0.5 mm).

The substrate having the thickness in the claimed range, however, is conventional in the art, as taught by Glenn et al. (Col. 4, lines 26+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the substrate of the proposed device of Carney et al. and Chia et al. having the thickness in the range 0.05 mm to 0.5 mm as claimed since the substrate with such claimed thickness is conventionally used in semiconductor art.

Conclusion

9. Applicant's arguments with respect to claims **1-26 and 31-32** have been fully considered, but they are deemed to be moot in view of the new grounds of rejection.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action because the underlined portions of independent claims 1 and 20 raise new issues that would require further consideration and/or search. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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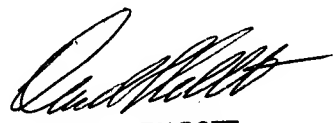
mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is (703) 308-1211. The examiner can normally be reached on 7:00 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Luan Thai

July 26, 2002


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